



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,365	07/30/2003	Ming-Tsair Chan	08919-096001 / 14A-910508	5410
26161	7590	09/02/2005	EXAMINER	
FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			KUMAR, VINOD	
			ART UNIT	PAPER NUMBER
			1638	
DATE MAILED: 09/02/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/630,365	CHAN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Vinod Kumar	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1103.2.004</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 6, 7, 11-14, 18, 19, 23-26, 28-31, and 33-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsieh et al. (Plant Physiol., issued July 1, 2002).

The claims are broadly drawn towards a transformed transgenic plant and method of producing plant comprising a recombinant nucleic acid that encodes a heterologous C-repeat/dehydration-responsive element binding factor (CBF), wherein the plant is naturally chilling-sensitive and expression of CBF increases tolerance of the said plant to chilling, oxidative stress, water-deficit, or salt, wherein the CBF could be CBF1, wherein the transformed plant is dicot plant species like tomato, and further comprising growing CBF transgenic plant in the presence of an exogenous gibberellic acid.

Hsieh et al. teach Chilling and oxidative stress tolerant transformed tomato plant, and a method of producing said transgenic plants, comprising inserting the *Arabidopsis* CBF1 (heterologous) cDNA encoding a C-repeat/dehydration-responsive element-binding factor, expressing the said factor in tomato plants, wherein the plants are naturally chilling-sensitive. Expression of said factor increases the tolerance of said transgenic tomato to chilling and oxidative stress. See page 1087, results section; page

Art Unit: 1638

1088, column 1; page 1090, column 2 and second paragraph; and page 1092, column 2.

Furthermore, Hsieh et al. also teach treating the transgenic tomatoes by exogenous application of gibberellic acid (GA). Transgenic plants grown in the absence of GA were dwarf whereas transgenic plants grown in the presence of GA displayed wild type growth (see page 1088, column 2; page 1093, column 1).

The method of making the transgenic plant in Hsieh et al. encompassed introducing CBF1 cDNA into cells of cotyledons, and regenerating a plant from the transgenic tissue (page 1092). Hsieh et al. indicate that their transformation protocol was performed as described by Fillatti et al. That the method of Hsieh et al. involve regenerating a transgenic plant from tissue comprising transformed cells is evidenced by Fillatti et al. (page 730, column 1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh et al. (Plant Physiol., issued July 1, 2002) in view of Kasuga et al. (Nature Biotechnology, vol. 17, pp. 287-291, issued March 1999)

The claims 1-35 are broadly drawn towards a transformed cell and plant, and a method of producing said cell and plant comprising a recombinant nucleic acid that

Art Unit: 1638

encodes a heterologous C-repeat/dehydration-responsive element binding factor (CBF) driven by a stress-responsive inducible promoter, wherein the cell and the plant is naturally chilling-sensitive and expression of CBF increases tolerance of the cell to chilling, oxidative stress, water-deficit, or salt, wherein the CBF could be CBF1, wherein the transformed cell and plant could be dicot plant species like tomato, and further comprising growing CBF transgenic plant in the presence of an exogenous gibberellic acid.

Hsieh et al. teach chilling and oxidative stress tolerant transformed tomato cell and plant, and a method of producing said transgenics comprising *Arabidopsis* CBF1 (heterologous) gene encoding C-repeat/dehydration-responsive element-binding factor, expressing the said factor in tomato plants, wherein the plants are naturally chilling-sensitive and expression of said factor renders said transgenic tomato chilling and oxidative stress tolerant as discussed above. See page 1087 results section; page 1088, column 1; page 1090, column 2 and second paragraph; and page 1092, column 2. Furthermore, transgenic tomato plants carrying CBF1 gene exhibited growth retardation patterns which was overcome by gibberellic acid treatment. See page 1088, column 2; page 1089, column 1 and figure 1.

Hsieh et al do not disclose the use of stress-inducible promoters in driving the expression of *Arabidopsis* CBF1 gene in tomato or any dicot plant transformed with said gene, wherein the expression of said gene result in chilling and oxidative stress tolerance.

Kasuga et al. teach the usefulness of using stress-inducible promoters to drive stress-inducible genes in response to environmental stresses like, freezing, drought or

Art Unit: 1638

salt. Kasuga et al teach the importance of using stress-inducible promoters in improving plant drought, salt, and freezing tolerance by over-expressing DREB1A using the stress-inducible *rd29A* promoter (a CBF1 homolog, see page 290, column 2) in *Arabidopsis*. Kasuba et al clearly teach that the over expression of stress-inducible genes like CBF3 enhanced freezing tolerance in *Arabidopsis* but over expression of such genes while using the constitutive CaMV 35S promoter resulted in severe growth retardation under normal conditions. Thus by using stress-inducible promoters to drive expression of said genes, drought and salt tolerance was conferred without significant growth retardation. See Page 287, column 2; page 288, figure 1 and page 289, figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time claimed invention was made to modify the method of producing chilling, oxidative stress, drought or salt tolerant plants of Hsieh et al. by using stress-inducible promoters, as taught by Kasuga et al. The motivation to do so is provided by Kasuga et al. who teach particularly the advantage of using stress-tolerant promoters and their usefulness in driving the expression of CBF3 in a transgenic plants, exhibiting stress-tolerant phenotype, while not causing a significant retardation in growth.

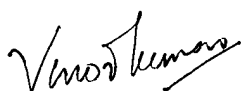
Thus, the claimed invention as a whole was prima facie obvious over the combined teachings of the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinod Kumar whose telephone number is (571) 272-4445. The examiner can normally be reached on 8.30 a.m. to 5.00 pm.

Art Unit: 1638

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William (Gary) G. Jones can be reached on (571) 272-0745. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Vinod Kumar, Ph.D.  
August 25, 2005



ASHWIN D. MENTA, PH.D.  
PRIMARY EXAMINER